

Assignment 1

AI1110: Probability and Random Variables
Indian Institute of Technology Hyderabad

CS22BTECH11061

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12.13.4.2 An urn contains 5 red and 2 black balls. Two balls are randomly drawn. Let X represent the number of black balls. What are the possible values of X ? Is X a random variable?

Solution: Possible values of X are as follows -

$$X = \{0, 1, 2\} \quad (1)$$

A random variable is an assignment of real values to each outcome of the experiment. Therefore, X is an random variable.

Probability Mass Distribution of X :-

$$1) \Pr(X = 0) = \frac{\binom{5}{2}}{\binom{7}{2}} = \frac{10}{21}$$

$$2) \Pr(X = 1) = \frac{\binom{5}{1} * \binom{2}{1}}{\binom{7}{2}} = \frac{10}{21}$$

$$3) \Pr(X = 2) = \frac{\binom{2}{2}}{\binom{7}{2}} = \frac{1}{21}$$